NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

WATERSPREADING

(acre)

CODE 640

DEFINITION

Diverting runoff from natural channels or gullies by means of a system of dams, dikes, or ditches and spreading it over relatively flat areas.

SCOPE

Waterspreading systems are suited to locations where the topography and climatic conditions are such that the additional moisture can be expected to improve plant growth. Areas that have an average annual precipitation of 8 to 25 in. benefit most from water spreading. This standard does not apply to Irrigation Systems, Surface and Subsurface (440-C).

PURPOSE

To provide moisture for plants in areas that can make effective use of additional moisture to supplement natural precipitation.

CONDITIONS WHERE PRACTICE APPLIES

Waterspreading systems apply where runoff can be diverted from drains to relatively flat areas where it will soak into the ground and remain until it is used by growing plants.

Soils shall be relatively free of problems associated with alkalinity and salinity. They shall have a moderate to high available moisture capacity. The soil profile shall be deep enough so that the available moisture capacity will be at least 4 in. for the normal extraction depth of the plants to be grown. Intake rates shall be slow enough to permit the spread of flood waters by surface methods. The topography of the spreading area shall be relatively flat, smooth, and free of rills or channels.

The normal seasonal distribution and volumes of runoff water from both rainfall and snowmelt shall be of such that the water applied by the spreading system will effectively increase plant growth. The diverted storm flows shall not be great enough to cause undue maintenance problems and shall not contain salts or sediment in kinds and amounts that will be damaging to the spreading area. The plants to be grown shall be able to withstand inundation for the length of time and at the season contemplated in the design. The combination of soils, slopes, and plants shall be of such that the area can withstand the application of flood waters without scour or erosion losses beyond allowable limits.

Care shall be exercised to create no detrimental effects for fish and wildlife.

North Dakota laws pertaining to water use and permits will be complied with along with State Water Commission regulations when planning and constructing waterspreading systems.

DESIGN CRITERIA

Depth of application. If the floodwater is to be spread over the area as diffused flow, the depth of application shall be the approximate depth of the water that the soil will absorb in the period equal to the estimated flow duration. For soils having rapid or very rapid permeability, this may be more than is needed to fill the root zone.

If the water is to be impounded on the spreading area, the depth of application shall approximately equal the available moisture capacity of the soil profile for the effective root zone of the plants to be grown.

Drainage area. The contributing area for a dependable water supply shall be of such that the volume of divertable flow needed for the design water application can be expected on an average of 8 years in 10. Systems with less than this amount must necessarily be simple and inexpensive and shall furnish at least the application volume that can be expected on an average of at least 1 year in 2.

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Excess water disposal. Provisions shall be made for returning excess water from the system to the stream channel without causing excessive erosion or damage to other interests.

Diversion works. The diversion works shall be automatic and shall require no manual control to divert the stream onto the spreading area, except on water courses that have expected flow durations of more than 24 hours. The works shall be capable of safely bypassing the peak flood flow. Suitable controls shall be provided so that only the desired rate of flow enters the conveyance system. The control device shall be adjustable to exclude flow from the spreading area when crops are to be harvested by mechanical means.

Conveyance system. The conveyance system shall have the capacity to safely convey the design flow from the diversion works to the spreading area.

Ditches, dikes, diversions. Ditches, dikes, diversions, and related structures shall be arranged and located to spread the diffused flow over the land surface or to pond the water over the land according to the type of system selected. Freeboard for dikes or diversions shall not be less than 0.5 ft. Side slopes of dikes, diversions, and ditches shall be stable so that they do not interfere unduly with management or harvesting operations. All dikes, diversions, ditches, and related structures shall meet NRCS standards for the particular structure or type of construction.

PLANS AND SPECIFICATIONS

Plans and specifications for waterspreading shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY

Quantity

1. Significant reduction of surface water quantity. Factors include the volume of water diverted, and volume of return flows.
2. Potential increase in soil moisture and ground water quantity. Assess additional surface area covered by diverted water, soil infiltration rates, diverted flow time, and evapotranspiration volume.

Quality

1. The reduction in sediment and adsorbed and dissolved nutrients and pesticides in surface waters. Consider soluble chemicals infiltrating in the water spread areas, the percentage of fine soil particles in the suspended sediment, and the amount of soil disturbance during construction.
2. Degradation of return flows by chemicals transported from the spreading area. Consider rate and volume of return flows, chemicals used, time of chemical application in comparison to predictable storm events, and the nature of sediments transported.
3. Potential ground water degradation from applied chemicals caused by increased infiltration. Important factors include available soil moisture storage, evapotranspiration, type and amounts of chemicals used, and saline geology.
4. Potential visual impacts of decreased sediment in return flows and the lack of streamflow below the water spreading area.